Cost Effective Growth of High Temperature Piezoelectrics for Adaptive Flow Control Actuators, Phase I

Completed Technology Project (2005 - 2006)

Project Introduction

TRS Technologies, Inc. in collaboration with The Pennsylvania State University propose to develop new families of high temperature piezoelectric materials for adaptive engine control. The identification, synthesis and characterization of these new materials will enable the design of new high temperature piezoelectric active flow control actuators that may enable dramatic increases in the efficiency of revolutionary alternative propulsion system concepts or the concept designs themselves. Specifically, the objective of the program is to identify materials for high authority (d33 ? 400 pC/N) piezoelectric actuators for fuel flow control in gas turbine engines. The high strain, high force actuators will be operational in the range of 600?1200

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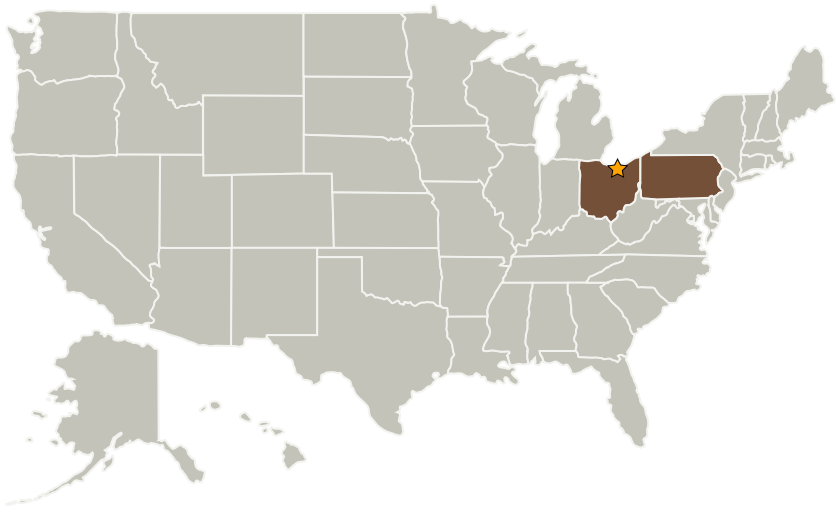
F with 1 to 10 kHz capabilities. This will be achieved by synthesizing new piezoelectric in both textured ceramic and single crystal form. The focus will be to use cost effectives methods to produce either textured microstructures or single crystal materials that lend themselves to domain engineering for enhanced piezoelectric performance at elevated temperatures.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
TRS Ceramics, Inc.	Supporting Organization	Industry	State College, Pennsylvania

Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Paul Rehrig

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors